Guidelines for Applying IEC Standards to Electrical Distribution Equipment

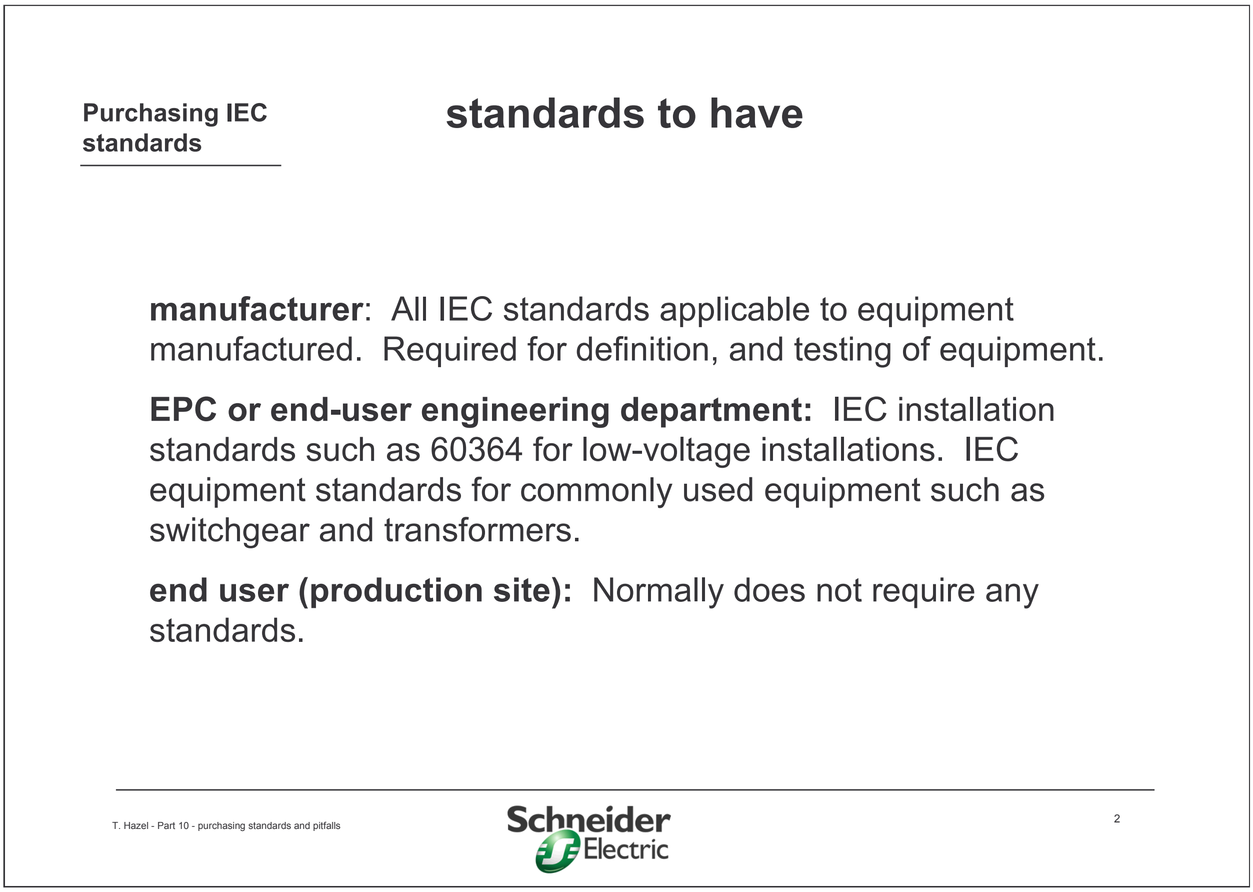
Part 10

IEC standards

standards to purchase & pitfalls using IEC standards

purchasing IEC standards

IEC standards can be purchased through the local committee or directly from IEC (www.iec.ch). Many standards contain several parts and it is difficult to know which to purchase without having read them. Standards are an expensive investment and must be kept up to date. Only standards needed on a routine basis to accomplish the tasks for which one is responsible should be purchased.



standards to have

manufacturer: All IEC standards applicable to equipment manufactured. Required for definition, and testing of equipment.

EPC or end-user engineering department: IEC installation standards such as 60364 for low-voltage installations. IEC equipment standards for commonly used equipment such as switchgear and transformers.

end user (production site): Normally does not require any standards.

manufacturer:

The manufacturer should have the latest version of all standards directly related to the equipment produced. In some cases this should also include standards of major components integrated into the equipment even if purchased rather than manufactured. The possession of up-to-date standards should be included in any audit.

EPC or end-user engineering department:

Engineering units purchase and install equipment rather than components. Engineers should be familiar with the IEC standards for major items of equipment. These include low-voltage assemblies (IEC60439-1), high-voltage metal-enclosed switchgear (IEC62271-200 and IEC60694), and transformers (IEC60076, parts 1, 2, and 8, and IEC60354 which is the loading guide). Engineers should have the up-to-date version of IEC Installation standards.

end-user (production site):

Generally end-users do not require standards at their production sites unless there will be extensive upgrading of existing facilities or new facilities added at their site.

Purchasing IEC standards

recommendations for EPCs 1/2

IEC equipment standards:

During evaluation prior to order, review requirements of IEC standards with manufacturer to ensure compliance, and also that equipment will meet the application requirements. Review the lists of information that should be given with tenders and orders.

Prior to inspection, review with the manufacturer the factory testing to be performed as per IEC standards.

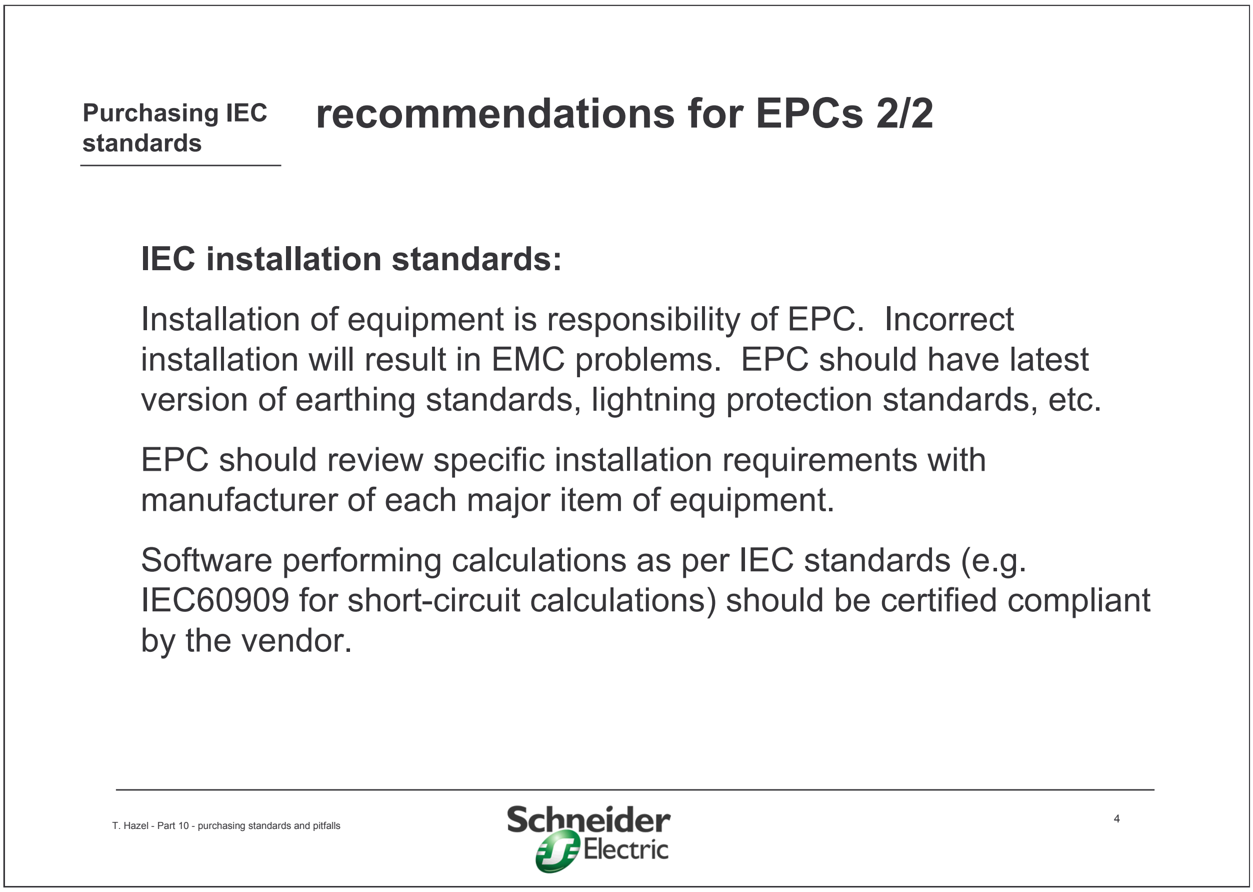
(The manufacturer should have the latest version of the applicable IEC standards.)

The review of equipment and product standards with the manufacturer is recommended for several reasons:

❑ It constitutes a design review and provides a means of checking the suitability of the equipment for the application.

❑ It provides a means for the EPC to review the standard to determine if it should be purchased.

❑ The EPC can determine if the factory tests are sufficient. For some applications additional testing should be done at the factory to ensure correct operation or installation at site.



Purchasing IEC standards

recommendations for EPCs 2/2

IEC installation standards:

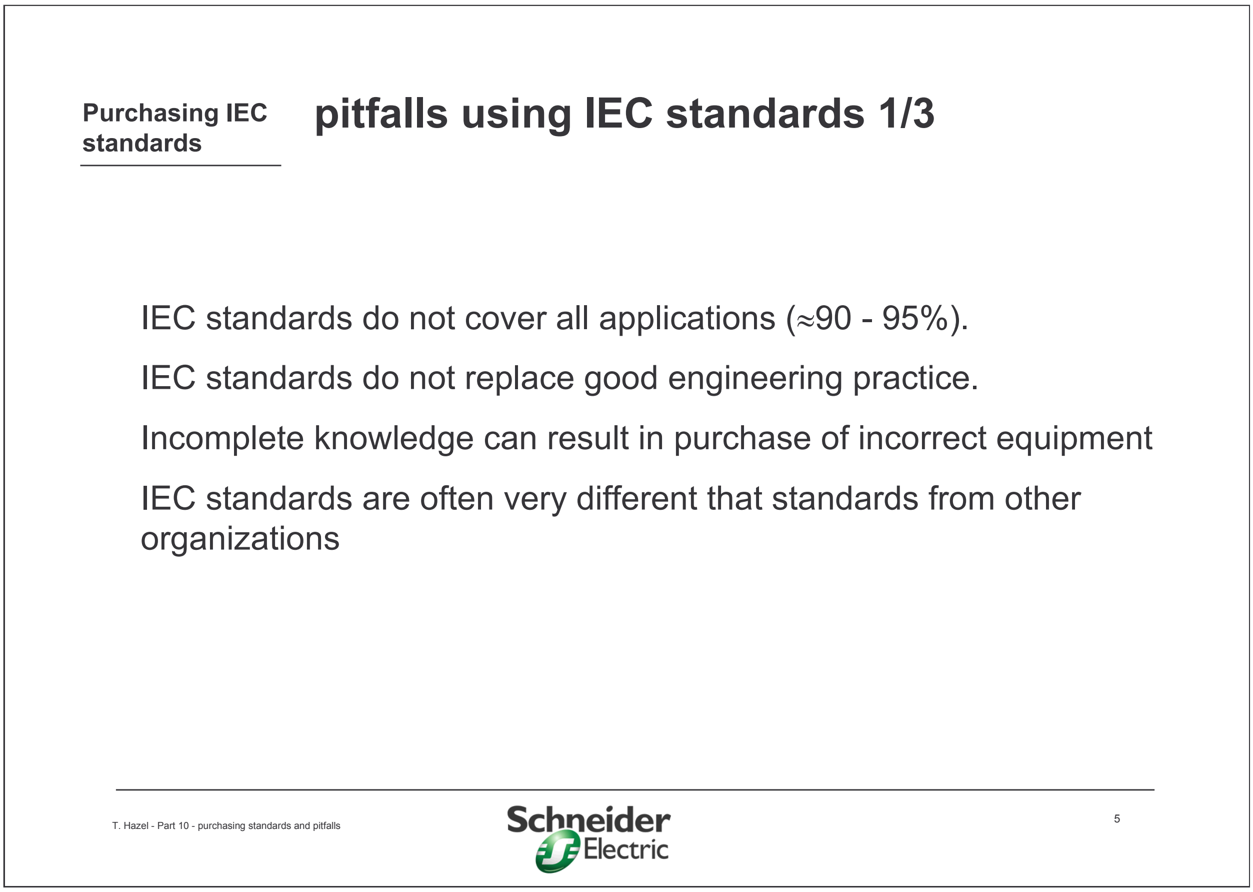
Installation of equipment is responsibility of EPC. Incorrect installation will result in EMC problems. EPC should have latest version of earthing standards, lightning protection standards, etc.

EPC should review specific installation requirements with manufacturer of each major item of equipment.

Software performing calculations as per IEC standards (e.g. IEC60909 for short-circuit calculations) should be certified compliant by the vendor.

EMC is a major concern in every modern industrial and commercial application. If the design is done correctly most problems can be avoided. If the design is done carelessly then it will be very difficult, and in some cases impossible to have all purchased equipment operating satisfactorily. EPCs should have the latest version of all installation standards since these represent the state of the art. Many old habits found to be useful in the past are the sources of problems in today’s applications. Using the standards as a guide can help identify such practices and change them.

Safety is a prime concern. Equipment will operate correctly only if properly installed. Installation standards provide information to enhance safety.



pitfalls using IEC standards 1/3

IEC standards do not cover all applications (≈90 - 95%).

IEC standards do not replace good engineering practice.

Incomplete knowledge can result in purchase of incorrect equipment

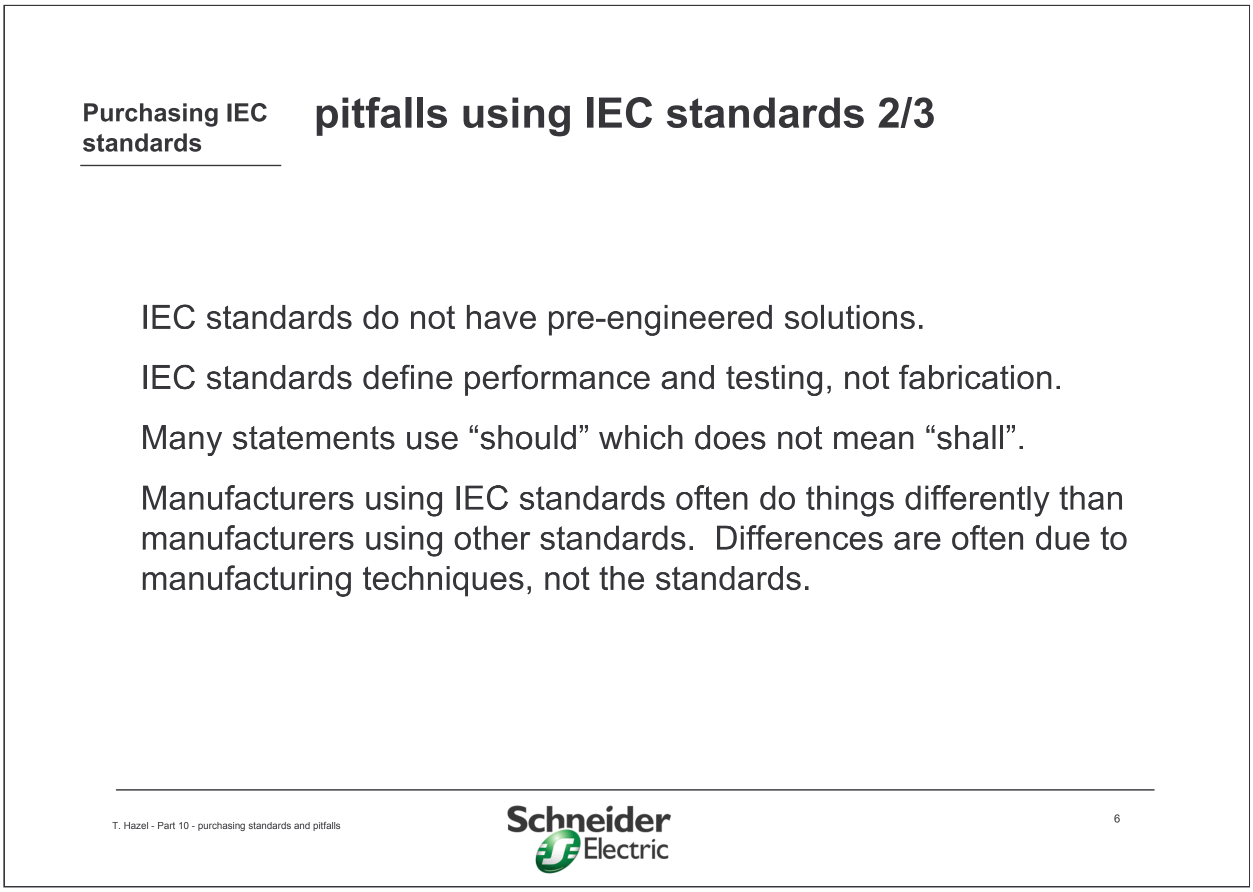
IEC standards are often very different that standards from other organizations

Since IEC standards are based on covering most, but not all applications, care must be taken to ensure that the standards used are applicable. When not, then a special agreement must be made with the manufacturer. Few extrapolation rules are applicable.

Good engineering judgement is required no matter what standards are used. Standards help avoid mistakes but do not replace solid engineering practice. The standards are not a safety net which will prevent “accidents” from happening if care is not taken during the design, installation, and commissioning of equipment.

Manufacturers often know the applicable standards better than those purchasing the equipment. Misunderstandings occur due to one party assuming that the other party knows certain standard details or options. Only after manufacturing has finished are certain mistakes discovered.

Equipment designed and manufactured according to other standards can look much different and have much different performance features than equipment manufactured to IEC standards. It is good practice to see what you want to buy before purchasing it.



Purchasing IEC standards

pitfalls using IEC standards 2/3

IEC standards do not have pre-engineered solutions.

IEC standards define performance and testing, not fabrication.

Many statements use “should” which does not mean “shall”.

Manufacturers using IEC standards often do things differently than manufacturers using other standards. Differences are often due to manufacturing techniques, not the standards.

IEC standards are performance and test oriented. There are few cases where dimensions or other physical criteria are specified. The purchaser must ask sufficient questions during the tendering stage to know what the size of the proposed equipment is, cable access information, etc.

Many requirements in IEC standards are worded “should”. The manufacturer is not required to implement these. It is possible to include in project specifications that the word “should” shall read “shall” in all applicable IEC standards.

Many cases of misunderstanding come from different manufacturing habits rather than standards. Once again try to see what you purchase before actually ordering it. It may cost a trip to a manufacturer’s plant but the savings during project execution normally cover such costs.

pitfalls using IEC standards 3/3

IEC standards give options but little guidance as to how to choose.

IEC standards must be used together with local regulations, and local habits.

IEC standards do not mean that there is a universally accepted solution.

The performance requirements of the application will dictate which standard options in IEC standards should be used. These should be determined on a project to project basis since requirements change from one site to another.

Local regulations can determine what standard options are required, or what additional requirements must be met. Examples were given in previous parts of the tutorial. Often equipment cannot be energized if local regulations are not adhered to. This can result in very expensive delays.

Do not expect that what is accepted in one country will be accepted in another. The same can be true for different regions of the same country.